

REMARKS

The Examiner's action dated July 19, 2005, has been received, and its contents carefully noted.

Independent claims 1 and 34 as well as, apparently, dependent claims 2, 4-6, 8-10, and 16-19 and independent claim 34 have been rejected under 35 U.S.C. 102(e) as being anticipated by Ohno et al. (US 6,476,441). Please note that the initial statement of the rejection refers to "claims 1-n". Therefore, this rejection can presently be understood to apply only to the claims specifically mentioned in the explanation of the rejection.

As for Claims 11-15, 20-25, and 27-33, the Examiner only indicates that they are written in functional language.

Claims 1 and 34 and several of the dependent claims have been amended to more clearly define the contribution of the present invention. Accordingly, this rejection is traversed for the reason that the claims, and particularly claims 1 and 34, as amended define a device that is not disclosed in the applied reference.

With regard to independent claims 1 and 34, the Examiner indicates that US 6,476,441 discloses a light-emitting element (col. 4, line 28 to col. 7, line 18 and fig. 1) operable in THz range (col. 5, line 44), and considers that this light element includes the features of Claims 1 and 34.

However, it should be noted that US 6,476,441 does not disclose the heterostucture layout configuration according to the invention as now defined in claims 1 and 34, providing an arrangement of a plurality of energy subbands and a predetermined dispersion of these subbands including equidistant neighbouring subbands creating effective (photon

emitting) resonant-condition transitions (i.e. of the same frequency) between the subbands.

According to the present invention, the arrangement of subbands and the dispersion profile provides for the resonant transitions between subbands of the EQW and/or HQW and/or ground electron subband of the EQW and ground hole subband of the HQW.

More specifically, according to the invention as now defined in claims 1 and 34, the heterostructure has a selected layout of the layers with a predetermined potential profile of at least one of the quantum wells, defining an arrangement of energy subbands of a predetermined dispersion in the conduction band of the first layer and/or the valence band of the second layer (see for example page 5 lines 5-9 and page 4 lines 13-16 of the present application). This arrangement of subbands of the predetermined dispersion provides for creating a condition of the multiple resonant radiative transitions substantially of the same frequency between the multiple energy subbands (see for example page 8 lines 1-3, and page 13 lines 22 to page 14 line 6).

The above features of the invention are not disclosed in US 6,476,441. What is disclosed in US 6,476,441 is the use of emission caused by a single intersubband transition within the same quantum well and preventing leakage current. This patent does not disclose the heterostructure configuration capable of providing effective (photon emitting) intersubbands transitions and effective (photon emitting) interband transitions (between the ground subbands of the EQW and HQW) in the THz spectral range, as in the invention.

Independent claims 1 and 34 have been amended to more clearly and specifically define the above features of the

invention, and therefore more sharply distinguish it from the cited reference. Some of the dependent claims have been amended correspondingly.

Also various claims have been amended as per the Examiner's remarks to remove the "functional language".

Claims 3 and 7 have been rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,476,441. These claims are dependent from Claim 1, and therefore the above arguments with regard to Claim 1 overcome this rejection.

Claim 26 has been rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,476,441 in view of Bour et al. (US 6,618,413).

This claim is dependent from claim 1, and therefore the above arguments with regard to Claim 1 overcome this rejection. Moreover, a combination of the techniques of US 6,476,441 and US 6,618,413 would not result in the present invention as defined by Claim 26.

Claims 35-59 stand withdrawn from consideration.

New dependent Claims 60 and 61 have been added. The subject matter of these claims is fully supported by the original description. More specifically:

- Claim 60 - "THz spectral range includes a spectral range from 0.1 through 20 THz" - see page 1 line 15-18;

- Claim 61 - "the frequency of the radiative transitions is lower than a typical radiated frequency of optical phonons" - see page 6 lines 20-22.

New independent Claim 62 recites a semiconductor device generally similar to that of Claim 1 but configured and operable for radiative transitions between the ground electron subband of the EQW and the ground hole subband of the HQW. This is supported by the original description on page 4 lines

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8-12. It is submitted that this claim defines over the applied references for reasons presented above.

New claim 63 depends from claim 62 and defines additional novel features of the invention.

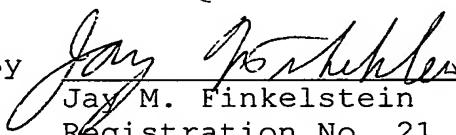
Accordingly, it is requested that all of the rejections presented in the last Action be reconsidered and withdrawn, that the pending claims be allowed and that the Application be found in allowable condition.

If the above amendment should not now place the application in condition for allowance, the Examiner is invited to call undersigned counsel to resolve any remaining issues.

Respectfully submitted,

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